

Study Guide

For use with pages 357–361

GOAL Find markups, discounts, sales tax, and tips.**VOCABULARY**

An increase from the wholesale price of an item to the retail price is a **markup**.

A decrease from the original price of an item to the sale price is a **discount**.

EXAMPLE 1 Finding a Retail Price

A store buys DVD players for \$50. The store marks up the price by 110%. What is the retail price of a DVD player?

Solution

Method 1: Add the markup to the wholesale price.

$$\begin{aligned}
 \text{Retail price} &= \text{Wholesale price} + \text{Markup} \\
 &= 50 + 110\% \cdot 50 && \text{Substitute.} \\
 &= 50 + 1.1 \cdot 50 && \text{Write 110\% as a decimal.} \\
 &= 50 + 55 = 105 && \text{Multiply. Then add.}
 \end{aligned}$$

Method 2: Multiply the wholesale price by $(100\% + \text{Markup percent})$.

$$\begin{aligned}
 \text{Retail price} &= \text{Wholesale price} \cdot (100\% + \text{Markup percent}) \\
 &= 50 \cdot (100\% + 110\%) && \text{Substitute.} \\
 &= 50 \cdot 210\% && \text{Add percents.} \\
 &= 50 \cdot 2.1 = 105 && \text{Write 210\% as a decimal. Then multiply.}
 \end{aligned}$$

Answer: The retail price of a DVD player is \$105.

Exercise for Example 1

1. In Example 1, what is the retail price of a DVD player if the markup percent is 125%?

EXAMPLE 2 Finding a Sale Price

Haircuts are 35% off for a limited time. The original price of a haircut is \$20. What is the sale price?

Solution

Method 1: Subtract the discount from the original price.

$$\begin{aligned}
 \text{Sale price} &= \text{Original price} - \text{Discount} \\
 &= 20 - 35\% \cdot 20 && \text{Substitute.} \\
 &= 20 - 0.35 \cdot 20 && \text{Write 35\% as a decimal.} \\
 &= 20 - 7 && \text{Multiply.} \\
 &= 13 && \text{Subtract.}
 \end{aligned}$$

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Method 2: Multiply the original price by $(100\% - \text{Discount percent})$.

$$\text{Sale price} = \text{Original price} \cdot (100\% - \text{Discount percent})$$

$$= 20 \cdot (100\% - 35\%) \quad \text{Substitute.}$$

$$= 20 \cdot 65\% \quad \text{Subtract percents.}$$

$$= 20 \cdot 0.65 = 13 \quad \text{Write 65\% as a decimal. Then multiply.}$$

Answer: The sale price of a haircut is \$13.**Exercise for Example 2**

2. In Example 2, what is the sale price of a haircut if the discount percent is 55%?

EXAMPLE 3 Using Sales Tax and Tips

The bill for your family's restaurant meal is \$47. You leave an 18% tip. The sales tax is 7%. What is the total cost of the meal?

Solution

Sales tax and tip are calculated using a percent of the purchase price. These amounts are then added to the purchase price.

$$\text{Total} = \text{Food bill} + \text{Sales tax} + \text{Tip}$$

$$= 47 + 7\% \cdot 47 + 18\% \cdot 47 \quad \text{Substitute.}$$

$$= 47 + 0.07 \cdot 47 + 0.18 \cdot 47 \quad \text{Write 7\% and 18\% as decimals.}$$

$$= 47 + 3.29 + 8.46 = 58.75 \quad \text{Multiply. Then add.}$$

Answer: The total cost of the meal is \$58.75.**EXAMPLE 4 Finding an Original Amount**

There is a 40% off sale on CDs. You buy a CD for \$12.95. What is the original price?

Solution

Let x represent the original price.

$$\text{Sale price} = \text{Original price} \cdot (100\% - \text{Discount percent})$$

$$12.95 = x \cdot (100\% - 40\%) \quad \text{Substitute.}$$

$$12.95 = x \cdot 60\% \quad \text{Subtract percents.}$$

$$12.95 = 0.6x \quad \text{Write 60\% as a decimal.}$$

$$21.58 \approx x \quad \text{Divide each side by 0.6.}$$

Answer: The original price of the CD is about \$21.58.**Exercises for Examples 3 and 4**

3. In Example 3, find the total cost of the meal if the sales tax is 6% and the tip is 15%.
4. A store marks up the wholesale price of a skateboard by 112%. The retail price is \$35. What is the wholesale price of the skateboard?